

Exhibit 3

CLOSURE PLAN

**FOR E&P WASTE DISPOSAL IN SALT
CAVERNS AND ASSOCIATED CAPROCK**

**MAIN PASS BLOCK 299
LEASE OCS-G 9372**

OFFSHORE LOUISIANA

Amended October 17, 2001

CLOSURE PLAN

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1. CAVERN CLOSURE AND CAPROCK WELL CLOSURE PROCEDURE

This plan outlines the general procedures for this closure of the three existing caverns and ten caprock disposal wells that will be operational at the Main Pass Mine location. The procedures outlined below are common to all cavern wells. A separate plugging and abandon plan has been submitted previously to the MMS as part of the sulphur mining operations and is included herein by reference. Further detail of caprock closure will not be provided in this plan. Where exceptions are appropriate, the exception is noted. Exceptions or special conditions for the caprock wells are also noted as appropriate. Where “cavern” is used in the text it also includes caprock wells unless otherwise noted.

Closure of a cavern occurs when waste conveyance into the cavern permanently ceases, and the cavern and the well casing are both secured in a manner that is protective of human health and the environment. The proposed cavern and caprock closure well procedures to be used in the event of failure or expiration of the life of the cavern or the facility are described below. The cavern closure process will consist of a series of steps which, including the post-filling monitoring period, may span several years. The plugging and abandonment procedures and cost estimates are detailed in the following sections.

TFS will notify the Regional Administrator of MMS at least 60 days prior to beginning closure of a cavern in accordance with the facility's approved written closure plan.

1.1 CAVERN SHUT-IN AND MONITORING

After any of the cavern in use are filled or continued use ceases, then the cavern will be shut in (closed) and observed prior to final plugging.

Solution-mined caverns in salt domes will experience a pressure build-up in the internal cavern fluid following closure primarily for two reasons:

1. The inward creep of the salt will compress the internal fluid; and
2. The temperature of the internal fluid will rise until it reaches the temperature of the surrounding salt. This temperature rise will result in an expansion of the internal fluid and an associated increase in the internal fluid pressure.

Both causes of cavern pressure build-up are being evaluated by Freeport and its consultants using heat transfer and thermomechanical finite element models. While little can be done to mitigate the pressure build-up associated with salt creep, the pressure build-up associated with heating of the internal fluid can be mitigated by controlled bleeding of the cavern during that period, allowing the expansion of the brine to occur without undue pressure build-up. **The brine displaced from this thermal expansion process is disposed in the caprock wells.**

In the course of the finite element modeling, stress changes in the salt will be tracked. The change in permeability and the likelihood of salt fracture can be assessed using the salt stress changes.

1.1.1 Monitoring Period, Sealing and Pressure Relief

After the cavern has been filled to a maximum of 90% volume with waste, operations will stop and the next cavern placed into service. The injection tubing assembly will be removed, the blanket oil will be removed, the wellhead will be closed, and pressure build up (if any) will be monitored at the wellhead. **The initial blanket oil volume is estimated at about 10,000 bbls.** If the pressure build up exceeds 90% of the maximum permitted operating pressure, the bleed valve on the wellhead will be opened and pressure relieved to an acceptable level. **Bleed water will be disposed in the caprock wells.**

Pressure will be monitored at the surface (well head) with a pressure transducer (or gauge) and will not require any additional tubing. The pressure transducer works on the same principle as the pneumatic piezometer where the pressure is converted to an electronic signal and there digitally displaced or recorded.

A cavern model will be developed based on operating history, known salt properties and measured data to predict long term pressure building. It is anticipated that at least one year of monitoring will be required to develop enough data to calibrate the cavern model. If the results of measurements vary significantly from predicted behavior, an extended monitoring period will be followed. At least six months of data will be collected to verify the model after recalibration. The duration of the monitoring will be adjusted until the pressure in the injection interval stabilizes or is predictable from the model. The duration required to calibrate the cavern model is expected to yield sufficient data to determine whether there is a realistic concern about fluid generation/infiltration into the cavern; at what rate any pressure buildup has occurred after filling has ceased; and confirms mechanical integrity of the cavern well and cavern before closure. Mechanical integrity of the cavern and well system will routinely be assessed through (1) periodic Mechanical Integrity Tests (MITs) and (2) pressure monitoring of the cavern internal fluids. The MITs of the cavern and well system will be performed using the nitrogen interface procedure used throughout the storage industry and typically required in states that allow any sort of waste disposal in salt caverns. At no time will the casing, casing seat, or cavern test pressures be allowed to exceed a pressure gradient of 0.8 psi per foot or exceed the known fracture gradient of the appropriate subsurface formation. The closure monitoring period also allows the vertical stress forces within the cavern to stabilize from the filling operations such that any pressures will have equilibrated within the waste mass.

If cavern pressure increases more than the model predicts, the measurement frequency will be increased, a review of the model (particularly the parameters used) and a comparison of the parameters against the measured values will be made. The results will be used to recalibrate the model using measured data. The maximum pressure change that could realistically occur is that intergranular pressure in the waste would attain the same value as the lithostatic pressure of the surrounding salt mass. When this in fact occurs, no adverse impact to the waste or environmental impact will result because most of the material in the cavern is a solid; thus attainment of lithostatic pressure simply indicates stability relative to the surrounding environment.

1.1.2 Sealing of the Cavern

The overall purpose of sealing the cavern prior to final closure is to mitigate the potential of downward fluid migration from the overlying geologic formations into the cavern. The potential pathways include the uncased portion of the borehole, the interface between the sealing material and the salt stock, and within the disturbed rock zone (DRZ) surrounding the borehole. The sealing method specified below follows the same general approach taken by the Department of Energy (DOE) for the sealing of the shafts at the (nuclear) Waste Isolation Pilot Plant (WIPP) site in Carlsbad, New Mexico. Alternating layers of salt, neat cement with 37 percent salt, and asphaltic tar were selected to seal the cavern because this combination results in the best short-term and long-term sealing method in salt and has been proven by use in Germany. Crushed salt was selected because it responds to the effects of temperature, pressure and moisture by reconsolidating to form a homogenous material very similar to the adjacent domal salt. Crushed salt is especially suitable because it can be introduced as a bulk material and will gradually both chemically bond and physically join with the surrounding salt of the dome and is compatible with the salt stock. This above described sequence will not be required or installed in caprock wells because of the difference in material properties between salt and caprock material. Cavern BR-01 and BR-05 have long stream casing terminating immediately above the cavern roof. Therefore, sealing of these caverns will occur within the last cemental string. The crushed salt section may be eliminated for these two caverns (as well as caprock closures).

The in-situ pressure acting on the crushed salt seal is the lithostatic pressure of the surrounding salt. Stresses on the seal will steadily increase until lithostatic equilibrium is reached. This equilibrium pressure is sufficient to effect recrystallization and hence tightness of the seal material within a relatively short time. A significant amount of study has been performed on the process of densification/recrystallization for the WIPP project by Sandia National Laboratories (Hansen, 1977). Experimental results have confirmed the process and construction methods have been developed that support the use of a salt column as a low permeability and compatible seal component. The laboratory studies and subsequent analyses of the data indicate that a small percentage of brine, when added to the crushed salt, substantially lowers the permeability of the crushed salt column because of a process called pressure-solution/precipitation (hereinafter referred to as "recrystallization"). Optical photomicrographs of test samples both immediately after compaction and after subsequent consolidation verify the pressure-solution/precipitation process. After recrystallization the salt provides a very low permeability seal with very long term effectiveness. Because the crushed salt requires time to recrystallize, the seal is constructed in layers to provide both short-term and long-term effectiveness. The cement seal with 37 percent salt and ultra fine cement provides an immediately effective plug. The asphaltic tar is an extremely impervious barrier, which, supported by each underlying salt layer, provides a seal to the borehole wall, the salt seal, and the cement layer above the salt. In this way, the composite seal provides both short-term and long-term integrity with superior sealing properties.

The anticipated thicknesses of sequential layers will vary from cavern to cavern. The rationale for the specified thicknesses is that the first cement plug starting at the cavern roof provides sufficient thickness to support the overlying column of crushed salt and acts as an effective short-term seal against any intrusion of brine from the borehole. The salt column is the primary long-term seal and comprises about 55% of the total uncased borehole length. The asphaltic tar provides an essentially impermeable seal from any fluid intrusion into the salt column that could possibly affect the reconsolidation of the salt. The upper section of the salt saturated concrete plug which terminates at the long string casing shoe, will fill any irregularities in the borehole

wall immediately below the last casing string, provide a good bond between the salt stock and the plug and promote healing of any DRZ immediately surrounding the borehole.

1.1.3 Venting Excess Pressure

Any pressure increase inside the cavern would be induced mainly by the compaction of the wastes under the effect of the salt creep and temperature variations inside the cavern. These phenomena can be anticipated with appropriate monitoring of waste compaction, measurement of salt creep and geothermal temperature. Any observed pressure evolution will be compared to the theoretical results, which will allow the adjustment of the model parameters governing the behavior of the wastes inside the cavern and therefore predict quite accurately the pressure change over time. Pressure increase due to formations creep will not occur in the caprock formation or in the caprock wells; there, venting will not be necessary for caprock wells.

1.1.4 Model Validation

Rigorous model validation would entail using a verified, calibrated numerical simulation to predict performance of the cavern/waste system and then comparing these results against actual measured values. Post-filling measurements of selected parameters in the waste mass will be made at the TFS facility. These will include total stress, stress changes with time and pore pressure (if possible).

The data collected during the well shut-in monitoring period will be compared to the initial predictions from the cavern model and the model will be updated. As subsequent data are collected, the model will be validated and cavern closure program will be finalized. As described in this modeling report, sealing the cavern in accordance with the proposed cavern closure plan will not result in any pressure build-up that could adversely affect the integrity of the cavern, well, or seal.

It is anticipated that at least one year of monitoring will be required to develop enough data to calibrate the cavern model. If the results of measurements vary significantly from predicted behavior, an extended monitoring period will be followed. At least six months of data will be collected to verify the model after recalibration. The duration of the monitoring will be adjusted until the pressure in the injection interval stabilizes or is predictable from the model. For example, if after a duration of 18 months, the measured intergranular stress matches predicated values based on laboratory data, and there is no pressure or unexpected events, monitoring will cease and cavern sealing activities will begin. The duration required to calibrate the cavern model is expected to yield sufficient data to determine whether there is a realistic concern about fluid generation/infiltration into the cavern and whether any pressure generation has occurred after filling has ceased. The closure monitoring period also allows the vertical stress forces within the cavern to stabilize from the filling operations such that any pressures will have equilibrated within the waste mass.

If cavern pressure increases more than the model predicts, the measurement frequency will be increased, a review of the model (particularly the parameters used) and a comparison of the parameters against the measured values will be made. The results will be used to recalibrate the model using measured data. The maximum pressure change that could realistically occur is that intergranular pressure would attain the same value as the lithostatic pressure of the surrounding salt mass. When this in fact occurs, no adverse impact to the waste or environmental impact

will result because the material in the cavern is a solid; thus attainment of lithostatic pressure simply indicates stability relative to the surrounding environment.

1.2 POST FILLING

The model validation, in conjunction with the anticipated lack of pressure build up in the cavern and the continued lack of change pressure, volume, and temperature in the monitored casing will be considered evidence of sufficient equilibrium to warrant plugging the wellbore and sealing the cavern. After the closure monitoring period is completed, and approval is given, the borehole will be filled with the salt seal sequence and the seal will be monitored as described below. The salt sequence procedure will not be used in caprock wells. Closure of caprock wells will follow the plugging and abandonment procedures already approved by the MMS for these wells.

1.2.1 Post Filling Seal Monitoring

Louisiana regulations for the use of salt caverns for E&P waste disposal requires that the operator, upon completion of cavern sealing, monitor the well for leaks and demonstrate that the seal is not leaking prior to plugging the wellbore (long string). As described, the cavern will be monitored to calibrate cavern modeling prior to placement of the seal. Prior to plugging the last cemented string (long string) with concrete, the salt seal sequence will be monitored to demonstrate that the seal is not leaking. Sealing of the cavern is implemented when cavern monitoring is completed.

The purpose of the seal is to prevent movement of waste constituents out of the caverns and into the overlying formations and to prevent infiltration of fluids into the cavern. Observations and monitoring of the seabottom above the cavern and caprock after sealing will determine whether there is infiltration of fluids out of the cavern.

Demonstration that no leaks have occurred from the cavern will require monitoring for a period of time. The method for monitoring the seal for leaks is described as follows. Prior to placing the seal in the space above the roof of the cavern, an initial cement grout plug will be placed in the uncased borehole immediately above the roof of the cavern. This will be done by first running a caliper log in the uncased borehole to verify the hole diameter and/or any changes in diameter in the hole since the well was drilled. An external casing packer (ECP), will be placed in the hole and filled. A tracer material will be placed in the cavern below the plug and the fluid above the plug monitored to determine whether the tracer material leaks from the cavern. If no tracer is noted within six months, it will be evidenced that the seal is effective and the cavern does not leak.

After approval to plug the well has been given by MMS, the last cemented casing (long string) will be plugged (filled with concrete) and abandoned. The wellbore will be filled from the top of the existing seal to the surface with Class A or H grade oil field or other equivalent API standard cements and additives as necessary. The casing will be cut off below the mudline in accordance with MMS regulations. In caprock wells, no caliper logs will be required prior to plugging the wells.

1.3 POST FILLING CARE PLAN

1.3.1 Injection Zone Pressure

The purpose of closure monitoring is to collect enough measured data to accurately verify the model used to predict cavern behavior. When these data have been collected and the model calibrated and verified, the predicted time of actual equilibrium can be estimated with assurance that the predicted trend will not change. At this point it is not necessary to continue monitoring to be assured that equilibrium will be reached, thus the potential adverse environmental impacts such as subsidence are also known (and mitigated if necessary).

The criteria described in the following section will be used to establish when, in practical terms, equilibrium has been reached between the pressure in the injection interval and the surrounding salt stock.

The model validation, in conjunction with the anticipated pressure build up in the cavern and the continued lack of change in casing pressure, volume, temperature and the specific criteria described below, will be considered evidence of sufficient practical equilibrium to warrant closing the wellbore and sealing the cavern. After the post-filling monitoring period is completed, and approval is given by the Regional Administrator, the borehole will be filled with the salt seal sequence and the last cemented casing (long string) will be plugged (filled with concrete) and abandoned. The wellbore will be filled from the top of the existing seal to the surface with Class A or H grade oil field or other equivalent API standard cements and additives as necessary. The casing will be cut off below the mudline in accordance with MMS regulations. The caprock wells will not be subject to the sealing sequence as noted previously

1.3.2 Post-Filling Equilibration Period

The casing will be monitored to determine whether there will be any unanticipated pressure and total stress build-up within the cavern. The monitoring during this phase of closure will be to determine both the rate of build up, as well as the actual magnitude of pressure and total stress. These data will establish the actual pressure and total stress build up curves that will validate the model and determine when equilibrium will be reached. When practical equilibrium is assured, then the cavern will be ready for the final plugging and abandonment which will include cementing of the wellbore to the ground surface.

Prior to closure of each well bore, TFS will conduct mechanical integrity testing of the portion of the long string casing and cement that will remain in the ground. The MIT will consist of a pressure test to establish that there is no leak in the long string casing, after which final closure of the well will be completed as described previously.

1.3.3 Modification of Post Filling Plan

Based on the results of the post-filling monitoring of the cavern, the post filling plan may be modified. Although no modifications are anticipated, if required, the proposed modifications will be drafted and submitted to the Regional Administrator of MMS for review and approval.

1.3.4 Corrective Action Plan

The above described closure plan and the monitoring period is designed to be able to assure with a high degree of confidence that once the cavern is sealed, that no further leak will occur. However, if post abandonment seafloor monitoring indicates that there may be a leak, a specific corrective action plan will be developed and submitted to the Regional Administer for review

and adoption. The basic elements of such a plan would include the following steps: 1) the seafloor would continue to be observed to determine that a leak of waste material is in fact escaping from the cavern or caprock as may initially be indicated. 2) A sampling program will be developed to obtain representative samples of the material and its distribution across the seafloor. 3) An analytical program will be implemented to determine the characteristics of the waste to determine whether the material will adversely impact the seafloor or marine environment. 4) If the result of the above programs indicates that a severe adverse impact is occurring, then a re-entry program will be developed to re-drill and re-enter the cavern (or caprock) and re-plug the appropriate well). A major continuing leak of hydrocarbons or other indications of waste products would be considered a severe adverse impact on the environment. If a re-entry well is drilled, then a post-plugging monitoring program will also be initiated to ensure no further leakage.

1.3.5 Seafloor Subsidence Monitoring

Potential subsidence of the seafloor resulting from past mining practices will be monitored on a routine basis. The subsidence monitoring will be conducted using close contour high resolution bathymetric measurement of the seafloor over the projected foot print of the salt dome. The results will be compared both to the baseline study and the immediate previous study to determine the magnitudes of subsidence, if any, and the incremental increase in subsidence if any. The subsidence bowl will be analyzed to determine whether there is an adverse affect on any structure or casing penetrating the caprock or salt stock.

1.4 FINANCIAL ASSURANCE

1.4.1 Financial Assurance and Cost of Closure

To calculate the cost of the closure bond, a reasonable closure scenario was used. The reasonable scenario, from a cost perspective, is one in which the cavern has been filled and is ready for monitoring. The cost for this procedure is provided in Table 1. The closure bond will include these costs.

Financial Assurance for closure of the caverns will be a maximum of \$ 1,650,000. Final original signed and effective financial assurance documents for the closure assurance will be complete and delivered to the Regional Administrator at least 60 days prior to commencement of drilling activities for the cavern well. The form of the assurance will be a standby letter of credit, bond or insurance policy. The cost of closure of the platform facility has been submitted to the MMS as part of the sulphur mining operations of Freeport – McMoRan as well as the caprock well plugging and abandonment plan.

1.4.2 Post Filling Costs

To calculate the post closure cost for inclusion in the closure bond, a typical sampling/analytical and cost schedule was assumed. It was also assumed that the post closure period would be five years for each cavern. These costs were estimated in accordance with the requirements of 43 LAC Section 515 and provided in Table 2.

TABLE 1 CAVERN POST FILLING COSTS

ITEM	QUANTITY	UNIT COST	TOTAL
Equipment Cost	1 unit	\$500,000/unit	\$500,000
Operational Cost	300 days	\$2000/day	\$600,000
Sealing Cost	1 event	\$50,000/event	\$50,000
Cementing Cost	1 event	\$50,000/event	\$50,000
Other Expenses (Technical Oversight, Monitoring, Analysis, etc.)			\$300,000
		<u>Subtotal</u>	\$1,500,000
		<u>10% Contingency</u>	\$150,000
		TOTAL	\$1,650,000

1.4.3 Liability Requirements

Liability requirements as outlined in 43 LAC Section 508 will be executed and effective and an original Certificate of Insurance will be delivered to the Regional Administrator at least 60 days prior to the beginning of drilling activities. Liability coverage will be provided by an insurance policy. The wording of the Certificate of Insurance will be identical to the wording specified in 43 LAC Section 501. The insurance policy will be issued for both sudden and non-sudden occurrences and issued by a carrier licensed to conduct business in the state. The Certificate of Insurance will specify that the coverage is extended for sudden and non-sudden occurrences to the salt cavern disposal wells. 43 LAC Section 500 et seq. will be followed unless other MMS provisions are more appropriate.

TABLE 2 CAVERN POST FILLING CARE COSTS

ITEM	QUANTITY	UNIT COST	TOTAL
Subsidence Survey	5 Events	\$70,000	\$350,000
Analytical Testing	5 Events	\$25,000/Event	\$125,000
Technical Consultants	5 Events	\$10,000/Event	\$50,000
Other Expenses	5 Events	\$2000/Event	\$10,000
		<u>Subtotal</u>	\$535,000
		<u>10% Contingency</u>	\$53,500
		TOTAL	\$588,500

1.5 POST FILLING CARE

1.5.1 Post Filling Monitoring

Subsidence will continue to be monitored and recorded annually for 5 years or until pressure in the injection interval is demonstrated to attain equilibrium with the salt stock, as determined by the procedure described above.

Once equilibrium is demonstrated, a final round of subsidence monitoring data for the cavern being closed can be collected to satisfy final closure requirements.

1.5.2 Post Filling Survey, Notifications, and Records

A seafloor survey plat with permanent benchmark data, the well and cavern locations and dimensions will be filed with the MMS.

Within 120 days of final plugging, TFS will file a closure report. The report will include a statement that the closure was in accordance with the closure plan.

TFS will retain the required records of the nature, composition, and volume of all conveyed materials for a period of five years after well closure. Additionally, TFS will provide annual reports to the MMS on the pressure monitoring during the closure monitoring period. The retention time period will be concluded at the fifth year anniversary of sealing the cavern. Five years after the closure of the cavern(s), TFS will deliver to the Regional Administrator copies of all the records and documentation that reflect the nature, composition and volume of all material injected.

1.6. REFERENCES

- 1969 Lambe-Whitman Method, Soil Mechanics. p. 151-161.
- 1983 Kratzsch, Helmut. Mining Subsidence Engineering. Springer-Verlag, p. 18-19.
- 1993 Spiers, C. J. and R. H. Brzesowsky. Densification Behavior of Wet Granular Salt: Theory versus Experiment. Seventh Symposium on Salt, Vol. I 83-92. Elsevier Science Publishers, B. V., Amsterdam.
- 1994 Crotogino, Fritz. Waste Disposal in Salt Caverns - The Situation in Germany. Paper Presented at Spectrum '94 Conference, Atlanta, USA., 14-18 August 1994.
- 1997 Hansen, F. D. et al. A Shaft Seal System for the Waste Isolation Pilot Plant. Sandia National Laboratories. Solution Mining Research Institute Meeting Paper, Fall 1997 Meeting, El Paso, Texas.
- 1997 Hansen, F. D. Reconsolidating Salt: Compaction, Constitutive Modeling, and Physical Processes. International Journal of Rock Mechanics and Mineral Science, Vol. 34: 3-4. Elsevier Science LTD.

CAVERN CLOSURE AND CAPROCK CLOSURE PROCEDURES